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A Case for a Well-Defined Negative Marxian Exploitation

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EUROPEAN UNIVERSITY INSTITUTE, FLORENCE

ECONOMICS DEPARTMENT

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BADIA FIESOLANA, SAN DOMENICO (FI)

Printed in Italy in October 1992
European University Institute
Badia Fiesolana
I – 50016 San Domenico (FI)
Italy

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Abstract

Karl Marx's exploitation theory, based on his notion of surplus value, is re-examined. It is found that in profitable economies without joint production the Marxian exploitation, as measured by the surplus value index, may be negative, its algebraic value being shown to depend on the timing of wage payments, specified by the labour contract. The implications for Marx's doctrine are discussed.

Acknowledgements

I wish to thank Paul A. Samuelson for his written comment. My thanks also go to the Department of Economics of the European University Institute, Florence, for an atmosphere conducive to research. An earlier version of the paper was presented at the Congress of the European Economic Association, Cambridge, 1991. The financial support from the Tempus Joint European Project (JEP-0005-91/92) and of the home institution is gratefully acknowledged.

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INTRODUCTION

Perhaps the most discussed topic in the economic writings of Karl Marx has been his doctrine of *surplus value* (Marx, 1976; 1969). Its double nature of a theory of interest or profit and of an *exploitation* theory attracts, in one way or another, scholars' attention for more than a century.

Yet, it seems that one curious though basic property of Marx's surplus value accounts has so far remained unnoticed. It reduces to the insight that the magnitude of surplus value, and sometimes also its algebraic sign, depends on a convention, i. e., on the timing of wage payments specified by the labour contract.

The outline of the paper is as follows. In section I we demonstrate that, due to the postulated *ex-ante* wage payment, Marx miscalculated his *commodity value*, designed to express the revalued amount of labour historically used up in production of a particular good. The algorithm for computing value under alternative methods of wage payment is presented in section II. In section III Marx's surplus value exploitation theory, focusing on the outcome of the *embodied labour exchange* between workers and capitalists, is expounded. A correction of the related Marxian computations is then made, showing that in this exchange the workers' net labour appropriation may be positive. The implications of this result for Marx's doctrine are discussed in section IV. Section V summarises.

For the sake of simplicity we consider a model of the one-sector economy. The extension to a multi-sector case is straightforward, and will only be performed in deriving conditions for emergence of negative workers' exploitation. This is relegated to the Appendix.

I. THE EVIDENCE ON COMPUTATION OF VALUE

In the opening chapter of *Capital* Marx presents the *definition of value*:

(*i*) All these things now tell us is that ... human *labour* is *accumulated in* them. As crystals of this social substance

... they are values (Marx, 1976, p. 128, emphasis added)

After that Marx goes on to elaborate on the value formula. Here, he shows to be aware of the fact that the determination of the *magnitude of value* is not merely a matter of definition, but also of correct computation:

(*ii*) We know that value ... is determined by the *labour materialized in* [the commodity], by the *labour-time socially necessary* to produce it. Our first step is *to calculate the quantity of labour objectified in* it (Marx, 1976, p. 293, emphasis added)

Then Marx turns to calculation and finally concludes:

(*iii*) All the labour *contained in* the [commodity] is *past labour*; and it is a matter of no importance that the labour expended to produce its constituent elements lies further back in the past than the labour expended on the final process ... The former stands, as it were, in the *pluperfect*, the latter in the *perfect tense*, but this does not matter. *The values of the means of production are* therefore *the constituent parts ... of the value* of the product (Marx, 1976, pp. 294-95, emphasis added)

Quotations (*i*)-(*iii*) thus show the value to be identified with the revalued labour historically expended for producing the commodity and, *in this sense*, objectified, materialised, contained or, as put elsewhere, *embodied in* it.

It appears, however, that the computation performed in (*iii*) was somewhat premature. *After* completing the value accounts Marx begins to introduce in the (so far) technocratic environment his vision of the *capitalist mode of production*, summarising the conditions for its emergence as follows:

(*iv*) [Capitalism] arises only when the owner of the means of

production *and subsistence* finds the free worker available, on the market, *as the seller of his own labour-power* (Marx, 1976, p. 274, emphasis added)

The proposition thus implies that workers are paid out of capital, getting presumably the subsistence before providing the labour input, i. e., at the begining of the production period. This also fits in with the cited axiom that, instead of selling labour services, workers sell their *labour power* or their *capacity to work*. In fact, after a couple of pages Marx explicitly states:

(*v*) It will therefore be useful, if we want to conceive the relation in its *pure form*, to presuppose ... that the possessor of labour-power, on the occasion of each sale, immediately receives the price stipulated under contract (Marx, 1976, p. 279, emphasis added)

The notion of *variable capital*, i. e., of wage goods as advances to production, follows from (*iv*) and (*v*).

Nevertheless, in spite of the existence of variable capital, the computation of value as the past labour embodied in the commodity ended *without* inclusion of the labour contained in the pre-existing means of subsistence which, *by the assumption*, and *like* the labour embodied in the pre-existing means of production, was surely expended in the pluperfect of quotation (*iii*).

However, a little later we find out that Marx did not fail to notice the expenditure of this labour quantity:

(*vi*) The portion of the capital invested in the purchase of labour-power is a *definite quantity of objectified labour*, a constant value like the value of the labour-power purchased (Marx, 1976. p. 322, emphasis added)

Indeed, after labelling the *living* or *perfect tense* labour, supplied by workers, the *new value*, Marx tried to eliminate the labour embodied in the advanced wage goods - the presence of which obviously calls for

a revision of the just completed value accounts:

(*vii*) Of course, we do not forget that this new value only replaces the money advanced by the capitalist in purchasing the labour-power and spent by the worker on the means of subsistence. With regard to the [money] expended, the new value appears merely as a reproduction. Nevertheless, it is a *real reproduction* and *not, as in the case of the means of production*, simply an *apparent one* (Marx, 1976, p. 316, emphasis added)

After consulting a few related passages (Marx, 1976, pp. 315-16, 322) it appears that Marx's explanation on excluding the labour contained in wage advances from the value accounts runs as follows.

The value of the means of production, i. e., the labour contained in the pre-existing material inputs undergoes *transmigration*, i.e., it is *transferred* to the new product, because its consumption is *productive*, in which case there is no consumption of value. Hence, this part of labour enters the calculation.

On the other hand, the value of labour power, i. e., the labour contained in the pre-existing wage goods, is *not* transferred - for unclear reasons, but presumably because the workers' consumption is not productive. The result is that this part of value, i. e., of past labour, *has to be reproduced*, i. e., *replaced by a portion of living labour* - as in quotation (*vii*) - being thus eliminated from the value accounts.

In a well-known apology for the labour value doctrine Hilferding (1949, p. 179) briefly repeats the described procedure of Marx. As regards later expositions of the *Capital* Volume I value formula, instead of being deleted, the "extra" labour term was probably overlooked, perhaps with the help of Marx's repetitive rhetorics about the *value of labour power* as an integral part of *new value*.

In summary, we conclude that in order to arrive at the proper outcome of the value accounts, we must appraise the fact that the past labour contained in the pre-existing wage goods advanced by capitalists cannot simultaneously constitute nor does it have anything

in common with (a part of) the living labour currently supplied by workers.

II. THE MAGNITUDE OF VALUE AND THE TIMING OF WAGE PAYMENTS

We consider a one-sector economy with homogeneous labour, circulating capital, and no technical choice. The production process is of the point-input-point-output type, exhibibiting constant returns to scale, and using no primary inputs other than labour. The period of production is taken as the time unit, and there exists a corresponding perfectly competitive commodity market. The labour is in excess supply and wage is determined at the minimum-of-subsistence level.

In the model appears a single labour-input coefficient a and a real wage b, with $B = ba$ being the wage-input coefficient. Furthermore, there is a material-input coefficient A, and a coresponding augmented-input coefficient $A^+ = A + B$. The latter is assumed to be smaller than unity, i. e., the economy is capable of provising positive profit or interest.

1. The Ex-Post Wage Payment

If wages are paid *post factum* there are no wage goods supplied by capitalists for starting production, i. e., there is no variable capital.

As a consequence, and using the adopted notation, the economy's rate of profits, π, amounts to:

$$\pi = \frac{1 - (A + B)}{A} > 0 \qquad (1)$$

where A of the denominator represents the capital invested per unit of the commodity. Thus the capital reduces to Marx's *constant capital*, identified with the advanced material inputs or *means of production*, and equal, under the assumptions made, with the expended amounts of these inputs.

Now, due to the *ex-post* wage payment, the *capitalistic* production of the good of period t *only* requires *previous* formation of material inputs. Consequently, the labour *historically* performed for producing

the commodity consists of the labour expended in $t-1$, which is a_{t-1}, plus the labour previously expended for providing for the means of production that had to be available at the begining of $t-1$. Thus, the labour expended in $t-2$ is, with the obvious notation, $a_{t-2}A_{t-1}$, that expended in $t-3$ is $a_{t-3}A_{t-2}A_{t-1}$, and so on, infinitely backward in time. The series of these labour terms may be written as:

$$h_{ex-post}^{historic} = a_{t-1} + \sum_{k=2}^{\infty} a_{t-k} \prod_{m=2}^{k} A_{t-k+m-1} \qquad (2)$$

which is the labour historically embodied in the commodity.

Following Marx - see quotation (*ii*) and note 1 - we now revalue all the inputs according to the present-day conditions of production:

$$\begin{matrix} a_{t-k} = a_t \\ = a \end{matrix} \quad , \quad \begin{matrix} A_{t-k+m-1} = A_t \\ = A \end{matrix} \quad ; \quad \begin{matrix} k = 1,2,\ldots,\infty \\ m = 1 \end{matrix} \qquad (3)$$

The substitution of (3) into (2) then yields the *socially necessary* labour embodied in the commoditiy[1], or the *commodity value*:

$$\begin{aligned} h_{ex-post}^{revalued} &= a + a\sum_{k=1}^{\infty} A^k \\ &= a(1 - A)^{-1} \\ &= h \\ &= a + hA \end{aligned} \qquad (2a)$$

Finally, we note that in (2a) the value is represented as the (revalued) sum of *living* and *past* labour, a and hA, respectively, or, strictly speaking, of *perfect tense* and *pluperfect tense* labour - see quotation (*iii*) - where the latter reduces to the labour embodied in material inputs[2]

It appears that in "unMarxist" case of wages being paid out of revenue the original value accounts can stand on its own feet. By verifying this, we now turn to the most often discussed "pure" case of Marx - summarised in quotation (*v*) - where wages are paid out of

capital.

2. The Ex-Ante Wage Payment

With the *ex-ante* payment of wages the rate of profits assumes the form:

$$\pi^{+} = \frac{1 - (A + B)}{A + B} \tag{4}$$

where in the denominator appear the material inputs, A, *and* the means of subsistence, B, advanced per unit of the commodity. Thus the capital consists of Marx's constant *and variable* capital.

As far as the computation of the *historic labour content* of the commodity is concerned, this has the following implication.

In addition to the formation of material inputs, the *capitalistic* production of the commodity produced in t-1 and available in t, now *also requires previous formation of wage goods*. Of course, the labour expended in t-1 is, as with the *ex-post* wage payment, a_{t-1}. But in t-2 the labour had to be performed both for the formation of material inputs and of wage goods, since the latter, *like the former*, had to be supplied at the beginning of t-1. This means that, using self-evident notation, the labour used up in t-2 is $a_{t-2}(A_{t-1} + B_{t-1})$, that expended in t-3 is $a_{t-3}(A_{t-2} + B_{t-2})(A_{t-1} + B_{t-1})$, and so on, *ad infinitum*. The historic labour costs therefore reduce to:

$$h_{ex\text{-}ante}^{historic} = a_{t-1} + \sum_{k=2}^{\infty} a_{t-k} \prod_{m=2}^{k} (A_{t-k+m-1} + B_{t-k+m-1}) \tag{5}$$

Let us now revalue the material and labour inputs as in (3), and let us do the same with the historically expended wage goods:

$$\begin{aligned} B_{t-k+m-1} &= B_t \\ &= B \end{aligned} \quad ; \qquad \begin{aligned} k &= 1, 2, \ldots, \infty \\ m &= 1 \end{aligned} \tag{6}$$

Substituting (3) and (6) into (5) we then obtain the amount of *socially necessary labour embodied in* the commodity, i. e., the

Marxian value under *ex-ante* wage payment:

$$h^{\text{revalued}}_{\text{ex-ante}} = a + a\sum_{k=1}^{\infty}(A + B)^k$$

$$= a\left[1 - (A + B)\right]^{-1} \qquad (5a)$$

$$= h^+$$

where:

$$h^+ = a + h^+(A + B) \qquad (8)$$

Following Marx, h^+ may be labelled the *augmented value* of good.

Thus equation (8) shows the commodity's correct embodied labour requirement to consist of Marx's *living labour*, a, as well as of the *revalued labour historically embodied in* the material inputs, h^+A, *and in* the wage goods, h^+B.

III. THE VARYING ALGEBRAIC SIGN OF SURPLUS VALUE

The dependence of the magnitude of value on the timing of wage payments, however curious, would be of limited interest to the reader of Marx were it not to have the impact on the computation of surplus value and, thus, on his theory of exploitation.

1. Surplus Labour and Surplus Value

As a preliminary, we note that Marx's exploitation theory based on the notion of surplus value is not the only exploitation doctrine of his. There is also another, based on his concept of *surplus labour*. Although Marx's surplus labour doctrine is not focused on here, in order not to be confused with the surplus value theory, it seems appropriate to give a brief exposition of it.

According to the surplus labour doctrine, the exploitation under capitalism occurs if the worker performs more labour-time for a given physical wage than he would have to do under some equally efficient *hypothetical* regime where there is no need for producing commodities other than those entering the wage. The difference between the *actual* and the hypothetical non-capitalistic *necessary labour-time* is then

called *surplus labour* (see Marx, 1976, pp. 324-25).

Unlike the surplus labour doctrine, the surplus value theory compares the two labour quantities performed within the *same* institutional enviromnent. According to it, exploitation occurs if the amount of *current labour* the worker supplies in a given capitalist economy happens to be greater than the *revalued amount of labour actually historically expended*, within the *same* economy, in the *capitalistic* production of his real wage, and in this sense *embodied in* it. At the same time, the difference between the two labour amounts, which are respectively referred to as the *new value* and the *value of labour power*, is called *surplus value*.

Marx's view on the outcome of the above labour exchange is perhaps best summarised in the context of his explanation of the origin of profits, which includes the statement of the surplus value formula. Thus in Volume I of *Capital* we read:

> *(viii)* But the past labour embodied in the labour-power and the living labour it can perform ... are two totally different things ... and this difference was what the capitalist had in mind when he was purchasing the labour-power (Marx, 1976, p. 300)

In Part II of *Theories of Surplus Value* we can find, in somewhat different wording, the same proposition:

> *(ix)* The enrichment of the capitalist only arises from the fact that in the production process he appropriates more labour than he has expended in wages (Marx, 1969, p. 323)

Within the surplus labour doctrine the determination of algebraic value of exploitation is a matter of *fiat*[3]. And this is why in this case we cannot speak about the existence of a corresponding *theory* of exploitation.

However, things are different with the surplus value paradigm, where both the magnitude and the algebraic sign of exploitation obviously follow from a correct analysis. Since the determination of

value is a precondition for determinig surplus value, quotation (*iii*) implies that Marx is not to deny this property of the surplus value doctrine. Nevertheless, his computations led him to conclude that workers are regularly exploited under capitalism, in the sense that the current labour each of them performs, $T = 1$, is always greater than the revalued past labour embodied in the real wage, L. In other words, Marx held that his surplus value index $T-L$ is regularly greater than zero.

In what follows we examine whether Marx was correct on this supposed universal positiveness of $T-L$, or situations may also arise when T is smaller than L, i. e., when, by Marxian criteria, workers are exploiting capitalists through unequal labour exchange[4].

2. The Surplus Value under Ex-Post Wage Payment

With the *ex-post* wage payment the past labour contained in the wage, i. e., the value of labour power, is reckoned on the basis of (2a), and amounts to:

$$L = hb \tag{2b}$$

The surplus value therefore is:

$$\begin{aligned} \textit{surplus value} &\equiv T - L \\ &= 1 - hb \qquad (9) \\ &= \frac{1 - (A + B)}{1 - A} > 0 \end{aligned}$$

Thus if the wage is paid *post factum* the positiveness of the rate of profits of (1) implies the positiveness of surplus value, i. e., the negativeness of worker's net labour appropriation.

3. The Surplus Value under Ex-Ante Wage Payment

With the *ex-ante* wage payment we calculate the labour embodied in the wage using (5a):

$$L = h^{+}b \tag{5b}$$

Hence, the surplus value index is:

$$\begin{aligned} \textit{surplus value} &\equiv T - L \\ &= 1 - h^{+}b \qquad (10) \\ &= \frac{1 - (A + 2B)}{1 - A} \end{aligned}$$

Obviously, the positiveness of of the rate of profits - see eq. (4) - no longer ensures the positiveness of surplus value, the algebraic sign of which now depends on the magnitude of material and wage input-coefficient.

Let us now represent the surplus value of (10) in the form which also covers the case of several industries. In order to do that, we rewrite (8) as:

$$h^{+}(1 - A) = (1 + h^{+}b)a \qquad (11)$$

and multiply (11) by $(1 - A)^{-1}$ to obtain:

$$h^{+} = (1 + h^{+}b)h \qquad (12)$$

Multiplying (12) by b and solving for hb we have:

$$\begin{aligned} h^{+}b &= \frac{hb}{1 - hb} \qquad (13) \\ &= L \end{aligned}$$

Thus the labour content of a given physical wage paid before starting production is expressed as a function of hb, i. e., as a function of the labour contained in the same wage basket in the case when the wage is paid *post factum* - see eq. (2b).

It appears that with the *ex-ante* payment of wages the amount of each worker's net exploited labour amounts to:

$$T - L = 1 - \frac{hb}{1 - hb}$$

$$= \frac{1 - 2hb}{1 - hb} \qquad (14)$$

This is shown to be positive as long as hb falls short of one half of the labour unit. However, if hb happens to be above that maginitude, it is the workers' net labour appropriation that becomes positive, which denotes the case of a well-defined negative Marxian exploitation - see footnote 4 and the related part of the text. As already announced, these conclusions are not altered in a multi-commodity framework - *cf.* equation (4A) of the Appendix.

IV. THE SURPLUS VALUE THEORY: A DISCUSSION

Since the above analysis modifies our view of the surplus value doctrine, a few comments seem to be appropriate here.

First, we note the revealed possibility of coexistence of positive profits and negative workers' exploitation in the Marxian system. It is widely recognised that Marx regarded his surplus value as the causal antecedent of profits in capitalist economies. However, it is now also well understood[5] that the surplus value concept is not able to perform this task in a meaningful way. In some reconstructions of Marxist argument a revision of Marx's claim has therefore been proposed, being represented by the so-called Fundamental Marxian Theorem on Exploitation[6].

The theorem asserts that in the absence of joint production the positive exploitation of workers is necessary and sufficient for the existence of positive profit or interest. Whatever the interest in such an equivalence relation, it is now seen that, *as long as exploitation is measured by the surplus value index, i e., defined by the outcome of the embodied labour exchange between workers and capitalists*, the theorem does not necessarily hold.

The second comment concerns the possibility of negative workers' exploitation *per se*, without a reference to the positiveness

of profits. Indeed, such a possibility constitutes a problem for Marx's theory in so far as it contradicts his view of inherently inferior position of wage earners under the stylised picture of a two-class capitalist economy.

To this it should however be added that problems of the surplus value doctrine do not end with the occurence of negative workers'exploitation. In fact, its most serious difficulty is that the negative exploitation may be turned into the positive one, and *vice versa*, by a mere change of the point of the production period in which wages are assumed to be paid. The choice of this point is, of course, of not more than conventional character, and it was an unfortunate decision of Marx to build a theory which basic conclusions may so vary with it.

V. SUMMARY AND CONCLUSION

This paper has re-examined the foundations of Karl Marx's exploitation theory based on his concept of surplus value.

It has been first shown that, due to the postulated *ex - ante* wage payment, Marx's value formula of *Capital* Volume I contains the error to the effect that it significantly underestimates the goods' revalued historic labour contents.

After that the surplus value has been traditionally defined as the difference between the current labour supplied by workers, and the revalued labour historically embodied in the wage goods supplied by capitalists. It has then been demonstrated that with Marx's assumption of wages being paid out of capital this surplus value may be negative. It was found, finally, that the *ex-post* wage payment ensures the negativeness of workers' net labour appropriation, i. e., the positiveness of surplus value.

It has thus emerged that the algebraic sign of exploitation may depend on the selected point of the production period in which wages are assumed to be paid, i. e., on the choice which is a matter of pure convention. Classified in the history of economics as a misleading profit or interest theory, the surplus value doctrine of Marx thus appears to have been an ill-conceived exploitation theory as well.

APPENDIX

In this Appendix we show how to calculate surplus value in a multi-sector economy, assuming the *ex-ante* wage payment.

The only difference in the computation, as compared with the starting equation of the one-sector model - eq. (5) - is that, instead of scalars *a*, *b*, *A*, and *B*, we now use vectors **a** and **b**, as well as matrices **A** and **B**, defined as follows: **a** is the positive labour-input coefficients vector, 1x*n*; **b** is the semipositive real wage vector, *n*x1; **A** is the nonnegative and connected material-input coefficients matrix, *nxn*; **B** = **ba** is the wage-input coefficients matrix; $\mathbf{A}^{+} = \mathbf{A} + \mathbf{B}$ is the productive matrix of augmented-input coefficients.

Consequently, the goods' historic labour contents are represented by the following vector series - *cf.* the corresponding scalar series of eq. (5):

$$\mathbf{h}^{\text{historic}}_{\text{ex-ante}} = \mathbf{a}_{t-1} + \sum_{k=2}^{\infty} \mathbf{a}_{t-k} \prod_{m=2}^{k} (\mathbf{A}_{t-k+m-1} + \mathbf{B}_{t-k+m-1}) \qquad (1A)$$

where on the left-hand side appears the (row-)vector of historic labour costs associated with particular commodities.

Revaluing the historically expended material and wage inputs, as in (3) and (6), we obtain the amounts of *socially necessary labour embodied in* particular commodities, i. e, the vector of correct values under *ex-ante* wage payment - *cf.* the scalar equation (5a):

$$\begin{aligned} \mathbf{h}^{\text{revalued}}_{\text{ex-ante}} &= \mathbf{a} + \mathbf{a}\sum_{k=1}^{\infty} (\mathbf{A} + \mathbf{B})^{k} \\ &= \mathbf{a}\left[\mathbf{I} - (\mathbf{A} + \mathbf{B})\right]^{-1} \\ &= \mathbf{h}^{+} \\ &= \mathbf{a} + \mathbf{h}^{+}(\mathbf{A} + \mathbf{B}) \end{aligned} \qquad (2A)$$

It now follows that the revalued labour embodied in the wage bundle **b** is $\mathbf{h}^{+}\mathbf{b}$. At the same time, the analogous procedure shows that under *ex-post* wage payment the labour embodied in **b** reduces to **hb**, where **h** =

$\mathbf{a}(\mathbf{I} - \mathbf{A})^{-1}$ is the (row-)vector of Marx's original values - this vector often appears in discussions of Marxian economics (for some references see footnote 2).

The relation between the two labour quantities is obtained using a full analogy with the scalar calculations of (11) and (12), and appears to be identical with the one-sector relation of (13):

$$\mathbf{h}^{+}\mathbf{b} = \frac{\mathbf{hb}}{1 - \mathbf{hb}} \tag{3A}$$

Thus the surplus value formula obtained in the one-commodity framework - see eq. (14) - still holds good in a multi-sector economy:

$$\begin{aligned} T - L &= 1 - \mathbf{h}^{+}\mathbf{b} \\ &= \frac{1 - 2\mathbf{hb}}{1 - \mathbf{hb}} \end{aligned} \tag{4A}$$

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NOTES

1. For the definition of socially necessary labour see Marx (1976, p. 129):

> Socially necessary labour-time is the labour-time requiredto produce any use value under the conditions of production normal for a given society.

2. For the definition of value and the multi-sector version of (2a) see, for example, Brody (1970, pp. 26-28), Morishima (1973, pp. 11, 13-15), Morishima and Catephores (1978, pp. 34-35). See also Meek (1973, p. *xviii*), where the definition is not accompanied by the mathematical formula.

3. In the presence of joint production, an awkward phenomenon for Marx's labour accounting, the strict positiveness of surplus labour cannot be ensured even in such a way. See, for example, Roemer (1981, pp. 49-50).

4. Indeed, this conclusion would directly follow from what may be considered to be the general Marxian definition of exploitation, based on Marx's statements of the type given in quotations (*viii*) and (*ix*). Thus in Hollander (1982, p. 871) we read (*cf.* also Roemer, 1981, p. 206):

> Any agent is defined to exploit his transaction partner if the ...labour appropriated from the latter exceeds the amount supplied

5. Largely due to the early critique by Dmitriev (1974) and to the refinements and extensions of his argument by such writers as Seton (1957), Samuelson (1971), and Steedman (1977).

6. See, for example, Morishima (1973, p. 6), Morishima and Catephores (1978, p. 38), Roemer (1981, p. 16). For a history of the proof of this theorem see Olgin (1992).

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